

What is claimed is:

1. A tankless reverse osmosis (RO) system which is capable of producing a permeate flow rate of at least 500 GPD when the system is operating under home reverse osmosis conditions and is dimensioned to fit within a standard kitchen sink cabinet.
2. The RO system of claim 1, wherein the system produces a permeate flow rate of at least 750 GPD.
3. The RO system of claim 1, wherein the system produces a flow of at least 1000 GPD.
4. The RO system of claim 1, wherein the system includes a membrane element in an assembly, the assembly having a longest dimension of less than or equal to approximately 35 inches.
5. The RO system of claim 1, wherein the system includes a membrane element in an assembly, the assembly having a longest dimension of less than or equal to approximately 22 inches.
6. The RO system of claim 1, wherein the wherein the system includes a membrane element in an assembly, the assembly dimensioned such that the assembly can be contained within a volume of less than or equal to approximately 4500 cubic inches.
7. The RO system of claim 1, wherein the system includes a membrane element in an assembly, the assembly dimensioned such that the assembly can be contained within a volume of less than or equal to approximately 2000 cubic inches.
8. The RO system of claim 1, wherein the system includes a membrane element in an assembly, the assembly dimensioned such that the assembly can be

contained within a volume of less than or equal to approximately 1500 cubic inches.

9. The RO system of claim 1, wherein the system includes one or more membrane elements in one or more housings, the one or more housings having a total displacement volume of less than or equal to approximately 668 cubic inches.

10. The RO system of claim 1, wherein a membrane of the system has an average A-value of approximately 16 or greater.

11. The RO system of claim 1, wherein a membrane of the system has an average A-value of approximately 22 or greater.

12. The RO system of claim 1, wherein a membrane of the system has an average A-value of approximately 25 or greater.

13. The RO system of claim 1, wherein a membrane of the system has an average A-value of approximately 30 or greater.

14. The RO system of claim 1, wherein a membrane of the system has an average A-value of approximately 35 or greater.

15. The RO system of claim 1, wherein the system includes a spiral wound membrane element having a diameter of approximately 6 inches or less and a length of approximately 18 inches or less.

16. The system of claim 15, wherein the membrane element has a diameter of approximately 3 inches or less.

17. The system of claim 15, wherein the spiral wound membrane element comprises a single-leaf spiral wound membrane element.

18. The system of claim 15, wherein the spiral wound membrane element includes a double leaf spiral wound membrane element.
19. The system of claim 15, wherein the spiral wound membrane element includes a multi-leaf spiral wound membrane element.
20. The system of claim 15, wherein the spiral wound membrane element includes a first membrane sheet and a second membrane sheet separated by a permeate channel, the permeate channel having an H-value of approximately 0.10 or less.
21. The system of claim 15, wherein the spiral wound membrane element includes a first membrane sheet and a second membrane sheet separated by a permeate channel, the permeate channel having an H-value of approximately 0.06 or less.
22. The system of claim 1, wherein the system is configured to have a recovery rate of approximately 25% - 50%.
23. The system of claim 1, the system including a membrane element, wherein the permeate flow does not go through a post-filter after going through the membrane element.
24. The system of claim 1, the system including an assembly, an inlet on the assembly to receive feed water, a prefilter communicating with the inlet to receive the feed water from the inlet, a membrane element communicating with an outlet of the prefilter to receive the feed water from the prefilter member, the membrane element having a concentrate outlet and a permeate outlet, wherein the permeate outlet is coupled to a faucet, and electronics located inside the assembly and operatively connected to the feed water and the permeate outlet to compare a TDS difference between them.
25. The system of claim 1, wherein the system includes an assembly, an inlet on the assembly to receive feed water, a prefilter member communicating with

the inlet to receive the feed water from the inlet, a membrane element communicating with an outlet of the prefilter to receive the feed water from the prefilter member, the membrane element having a concentrate outlet and a permeate outlet, wherein the permeate outlet is connected to a faucet, a first set of indicators exposed on a surface of the assembly to show the condition of the membrane element and the prefilter member, and a second set of indicators exposed proximate the faucet to indicate a condition of the system.

26. A system, comprising;
- an inlet to receive feed water;
 - a pre-filter coupled to the inlet to receive the feed water, the pre-filter having an outlet;
 - a membrane element to receive the feed water from the outlet of the pre-filter, the membrane element having a permeate output and a concentrate outlet;
 - and
 - a faucet to receive filtered water from the permeate outlet, wherein there is not an intervening storage tank between the membrane element and the faucet;
 - wherein the membrane element is capable of producing a permeate flow rate of at least 500 GPD under home reverse osmosis conditions and wherein the membrane element is enclosed within an assembly dimensioned to fit within a standard kitchen sink cabinet.

27. The system of claim 26, wherein the membrane element is capable of producing a permeate flow rate of at least 750 GPD under home reverse osmosis conditions.

28. The system of claim 26, wherein the membrane element is capable of producing a permeate flow rate of at least 1000 GPD under home reverse osmosis conditions.

29. The system of claim 26, wherein the membrane element includes two or more membrane elements having a parallel flow configuration.

30. The system of claim 26, wherein the membrane element includes two or more membrane elements having a series flow configuration.

31. A system, comprising:

an elongated assembly having a first end and a second end;

an inlet on the assembly to receive feed water;

a pre-filter member communicating with the inlet to receive the feed water from the inlet;

a first membrane element communicating with an outlet of the pre-filter to receive the feed water from the pre-filter member, the membrane element having a concentrate outlet and a permeate outlet;

a first outlet on a surface of the assembly and communicating with the permeate outlet of the membrane element;

a second outlet on a surface of the assembly and communicating with the concentrate outlet of the membrane element;

an endcap on one end of the assembly which covers one end of the pre-filter member and one end of the membrane element; and

a single endcap retaining member for removably mounting the endcap to the assembly.

32. The system of claim 31, including a second membrane element, wherein the pre-filter member, the first membrane element, and the second membrane element are longitudinally oriented within the assembly.

33. A system, comprising:

an elongated housing assembly having a molded structure including a cylindrical pre-filter chamber oriented longitudinally within the assembly and a cylindrical membrane element chamber oriented longitudinally within the assembly and a permeate flow tube running longitudinally through the assembly and a concentrate flow tube running longitudinally through the assembly;

an inlet on a first end of the assembly to receive feed water;

a pre-filter member located within the pre-filter chamber and communicating with the inlet to receive the feed water from the inlet; and

a membrane element located within the membrane element chamber and communicating with an outlet of the pre-filter to receive the feed water from the pre-filter member, the membrane element having a concentrate outlet and a permeate outlet, wherein the permeate outlet is connected to a first end of the permeate flow tube and wherein the concentrate outlet is connected to a first end of the concentrate flow tube.

34. The system of claim 33, wherein the housing assembly includes a first endcap on a first end of the assembly, the first endcap including molded passages to control fluid flow from the pre-filter to the membrane element.

35. The system of claim 34, wherein the housing assembly includes a second endcap on a second end of the assembly the second endcap including molded passages to control fluid flow between the element and the permeate flow tube and the concentrate flow tube.

36. A system comprising:
an assembly;
a pre-filter member within the assembly to receive feed water from a water line; and
a pair of membrane elements located within the assembly and connected in series to receive the feed water from an outlet of the pre-filter member;
wherein the pair of membrane elements include permeate outlets and concentrate outlets, wherein the permeate outlets are connected to a faucet;
wherein the pair of membrane elements are adapted to produce a permeate flow rate of at least 500 GPD when operating under home reverse osmosis conditions.

37. The system of claim 36, wherein the pair of membrane elements are adapted to produce a permeate flow rate of at least 750 GPD.

38. A system comprising:
a manifold including one or more threaded sockets;

one or more cartridge housings removably attachable to the threaded sockets; and

a base leg including one or more cartridge holding portions to support a distal end of each of the one or more cartridges, wherein at least one of the cartridge holding portions as adapted to engage an outer portion of each of the one or more cartridge housings such that the at least one cartridge holding portion can be used to either tighten or loosen the cartridge housing from one of the threaded sockets.

39. The system of claim 38, wherein each of the one or more cartridge housing includes ridges on an outer surface of the cartridge housing to engage the at least one cartridge holding portion.

40. The system of claim 38, wherein the base leg includes a generally triangular shape.

41. A system comprising:

a housing assembly for holding one or more membrane elements, the housing including an inlet port, and two outlet ports;

a connector for connecting outside tubing to the inlet and outlet ports, the connector including a plurality of members each having a first end connectable to a hose and a second end for connecting to one of the ports; and

a key configured to hold the connector members in position on the inlet and outlet ports.

42. The system of claim 41, wherein the plurality of members each include mating protrusions to mate with adjacent ones of the plurality of members.

43. The system of claim 41, wherein the second end of each of the plurality of connector members includes a quick-connect fitting.